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GEOLOGY AND PALEONTOLOGY.

The Western Lowland of Ecuador.—A paper by Dr. Th. Wolf, read at the Berlin Geographical Society, Dec. 3, 1892, gives the following account of the Western Lowland of Ecuador:—

Its superficial area is 25,950 square miles. As late as the end of the Neocene period the waves of the ocean washed the foot of the Western Cordillera of Ecuador. At the commencement of the Plistocene period a part of the northern half of the lowland appeared above the ocean while the southern half was covered over by an immense sandstone formation. The latter, containing here and there the bones of mastodons and horses, was, at a very recent period, subjected to upheaval, which gave to the country very nearly its present configuration.

The great low-lying plain east and west of the Gulf of Guayaquil as well as the smaller alluvial plains, are quite recent formations, true deltas. The highest points of the coast ridge attain an elevation of 2,300 feet in a chalk range between Guayaquil and the sea, and in the Cordillera of Chongon and Colonche. In the Neocene region there are summits of from 650 to 1000 feet. The Plistocene marine strata form a gently undulating country rising from 65 to 260 feet above sea-level, while the extensive plain of alluvium is quite level. The rivers which issue from the Western Cordillera, do not flow due west; but, in consequence of the chalk range which runs north and south, form two extensive river systems, Rio Guayas emptying into the Gulf of Guayaquil, and Rio Esmeralda, flowing without a delta into the sea at 1° N. latitude. (Geog. Journ. Feb., 1893).

Devonian Fossils from Manitoba.—During the summer season of 1888 and 1889, Mr. J. B. Tyrrell made a collection of the fossils of the Devonian rocks of the islands, shores and immediate vicinity of Lakes Manitoba and Winnipegosis. This collection forms the subject of a report by Mr. J. F. Whiteaves, published by the Geological Survey of Canada. According to the author, this collection is one of the most important that have been brought back by the Survey collectors for many years. The species represented are of unusual interest, not only on account of the number of new forms, but also as showing the close relations that exist, in so many respects, between the fauna of these rocks and that of the Devonian rocks of Europe.

Mr. Whiteaves' report comprises 105 pages of text illustrated by 15 full page plates. The classification followed, with few exceptions, is that adopted by Dr. Karl Zittel in his Handbuch der Paleontologie. (Contributions to Canadian Paleontology. Vol. I, Pt. IV, 1892).

Jura and Trias in Taylorville, California.—Professor Hyatt gives the following preliminary results of an examination of four different collections of intervebrate fossils from the Jura and Trias of the Taylorville region in California.

A general comparison of the Trias of Taylorville with that of Idaho and of the Star Peak range in the Humboldt region, Nevada, shows that the Idaho Trias has a well marked Triassic fauna, with fossil cephalopods recognized in Europe by Mojsisovics, Steinmann and Karpinsky, as belonging to the lower part of the Triassic system. This fauna appears to be more nearly the equivalent of that of the Werferner beds of the middle Buntersandstein of the German Trias than of any other.

The Trias of the Star Peak range contains an unmistakably younger fauna. The species show a parallelism with the Muschelkalk instead of the Saint Cassian stage, as has been supposed.

The Trias of Taylorville is quite as interesting as that of the other two localities, and it is suggestive that its age, as indicated by the fossils, is that of the Noric and Karnic series in the upper Trias.

The Lower, Middle and Upper Jura, are represented by characteristic fossils which can be closely compared with representative European species. No remarkable or entirely new types occur, such as have been found among the vertebrata of this continent.

On comparing the Taylorville with that of Aurora, Wyoming, and of the Black Hills, it is found that the latter were deposited in the same basin, the species being largely identical, and that they can be spoken of together as having characteristice of the fauna of the Callovian or Oxfordian in the upper Jura of Europe.

The supposed Callovian of Mount Jura has no species in common with those of Aurora or the Black Hills. This accords with the distinct fauna of the Bicknell sandstone and the Hinchman Tuff, and would go to show that there was no direct connection between the upper Jurassic faunas of the Rocky Mountain region.

The Oolite of the Rocky Mountain region is too little known to permit comparison. Dr. White has described a few fossils found by Dr. Peale near the lower cañon of the Yellowstone in Montana.

The lower Lias, having certain forms of undeniably European facies, occurs in western and southwestern Nevada, and perhaps in California east of the crests of the Sierra. These faunas are older than those found at Mount Jura.

It is obvious that the Jura occurs in widely separated patches, and that, so far as now known, Mount Jura exhibits a larger number of fragments of the series of the Jurassic system than any other locality in the United States. (Bull. Geol. Soc. Am., Vol. 3, 1892.)

The Post-Laramie Beds of Middle Park, Colorado.—Mr. Whitman Cross, in a paper read before the Colorado Scientific Society in October, 1892, points out the unconformities that exist between the Middle Park Beds of Colorado and the underlying recognized Laramie formations, and calls attention to the difference in lithological characters. A study of specimens collected at different points show that a large series of andesite rocks strongly resembling those that constitute the Denver conglomerates take part in this formation. The Lignitic beds also resemble those of the Denver beds. In regard to the fossil plants Mr. Cross finds that 12 out of 21 species from the Middle Park beds occur in the Denver beds. These facts, the author believes, justifies him in correlating the Middle Park beds with the Denver, and he agrees with Mr. R. T. Hill in assigning them to the Post-Laramie group.

It has been suggested by Mr. J. B. Hatcher,[1] that in view of the fact that at least two species of Agathaumas have been described from the Denver beds, that it would be well to take into account the evidence from the vertebrate fauna before settling definitely the age of the beds under discussion. (Proceeds Col. Sci. Soc. 1892).

Marine Pliocene Beds of the Carolinas.—The tables of the Molluscan fauna of the Waccamaw and Croatan Beds of the Carolinas recently published by Dr. Dall, establish the presence of genuine Pliocene beds in both the Carolinas. The Pliocene of Tuomey and Holmes is shown to be based on a confusion of species belonging to at least two horizons, and hence the classifications based upon the supposed characters of this non-existent fauna may now be consigned to oblivion. (Trans. Wagner Free Inst. 1892.)

Geological News.—General.—Mr. Ralph S. Tarr has called attention to the resemblance between the terraces now forming on the

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[1] Amer. Journal Sci., Feb., 1893.

Colorada River in Texas, and the older ones of the Connecticut River. He suggests that the modes of formation may be identical. In the one case the floods and sentiment supply arise chiefly from the climatic accident of desiccation, while in the other they are the result of glacial accident. (Am. Journ. Sci. July, 1892.)

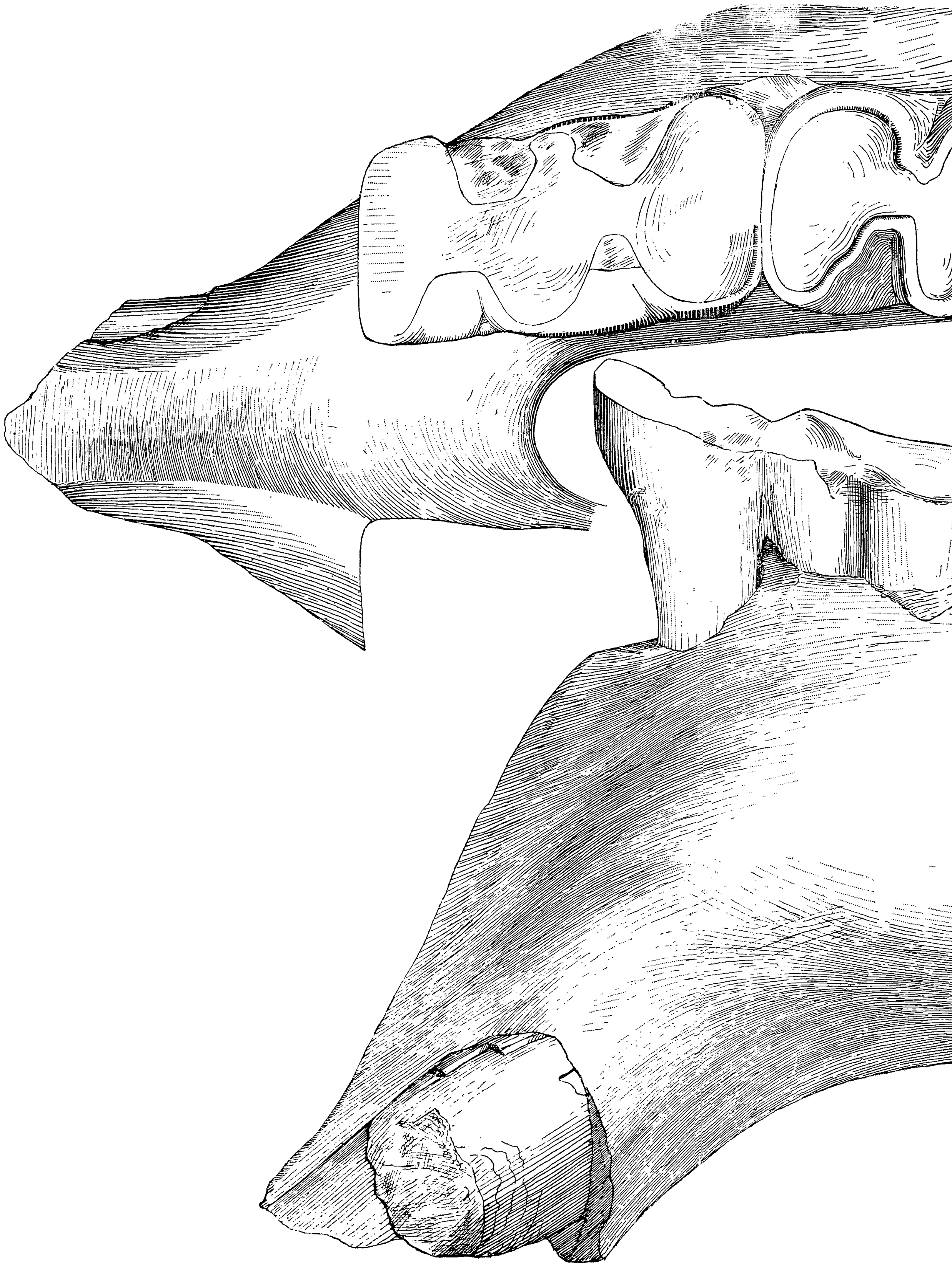
M. E. Ficheur has added an important fact to the knowledge of the geology of northern Africa. He finds that on the northern flank of the Atlas Mountains in Blidah (Algeria), and throughout the extent of the region occupied by the Chiffa schists, there is an anteclinal fold affecting the whole sedimentary series, a fold long drawn out and turned toward the north. This phenomenon appears to be the result of a lateral thrust from the north against the resisting mass of the Chiffa schists which formed, to all appearance, an island in the Cretaceous Sea. This folding took place after the Cartéirenne period, and very probably after the Helvétien stage, for these beds are seen to be disturbed at the end of this range on the slopes of the spur on the left side of the Harrach. M. Ficheur is of the opinion that the folding is limited to the Blidah range. (Revue Scientifique, Feb. 1893.)

Paleozoic.—In his notes on the Devonian formation of Manitoba, Mr. J. F. Whiteaves remarks that in Manitoba the Stringocephelus zone is remarkably clearly developed, and holds a rich fauna, whereas in the Mackenzie River district, most of the fossils so far collected seem to be from the Cuboides zone. (Geol. Mag., Feb., 1893.)—Mr. Rollin Keyes calls attention to a well defined Kinderhook fauna intercalated in the Burlington limestone in northeastern Missouri. The fossils, chiefly molluscan, are found in a heavily bedded white encrinital limestone with a peculiar white chert in nodules and irregular bands. The forms are all species which characterize the Kinderkook of Burlington, Iowa. This seems to be an illustration of Barrande's celebrated " doctrine of colonies. " (Am. Journ. Sci., Dec., 1892.)

Mesozoic.—According to Mr. H. W. Fairbanks the granitic rocks of southern California are not Archean. They are present as intrusions squeezed into rocks varying in age from the Jurassic to Paleozoic inclusive at the close of the Jurassic. (Geol. Mag., Feb., 1893.)——Mr. A. Smith Woodward reports the skeleton of a fish from the Oxford Clay of Wiltshire, England, which he "provisionally quotes as an immature example of *Ischyodus egertonii.*" The fossil tends to confirm the reference of *Ischyodus*-like fishes to the existing family of

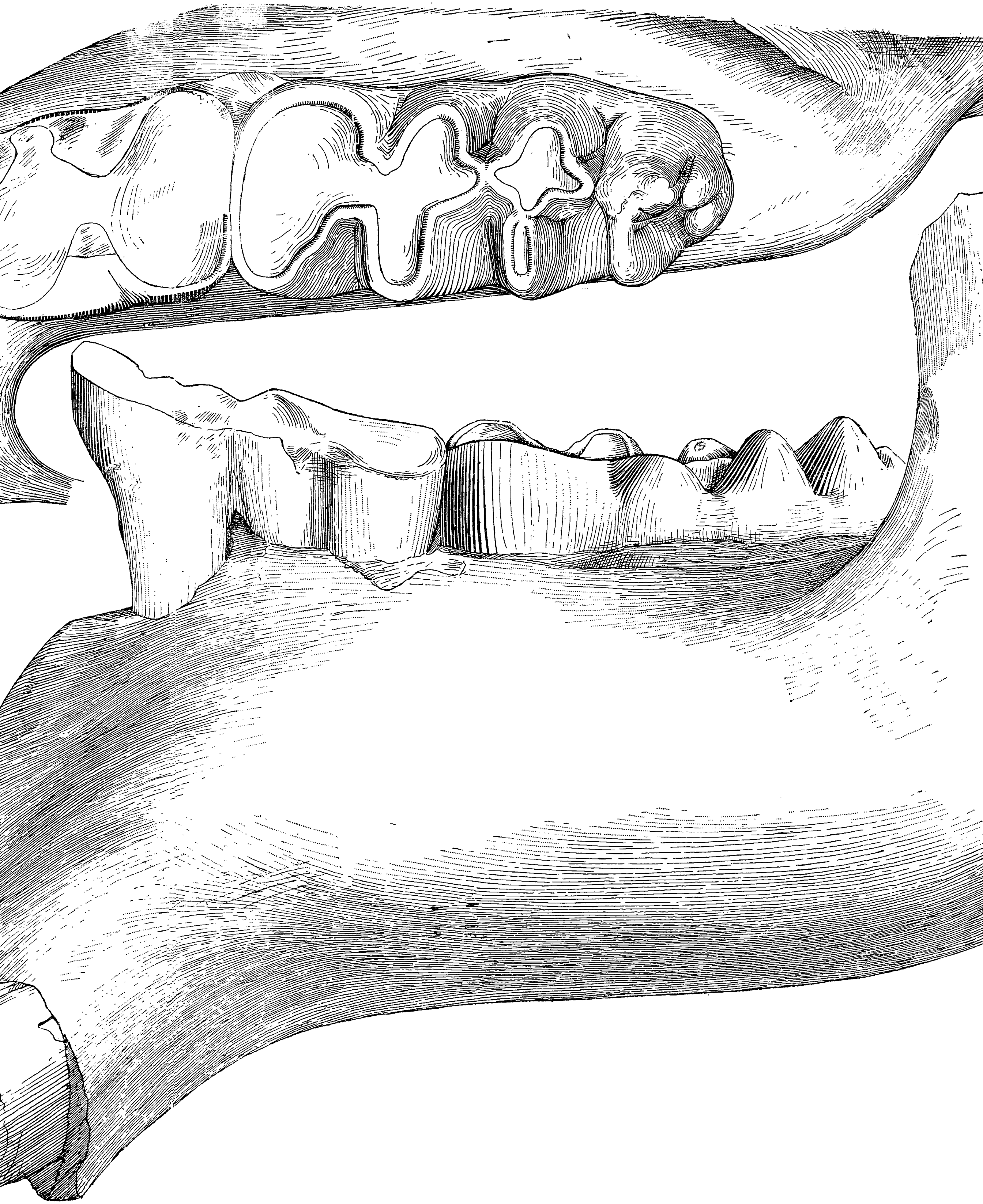
Chimæridæ. (Ann. Mag. Nat. Hist., Jan., 1892.)——The fossil fragments of jaws and teeth described by Gervais under the name *Lepidosteus suessoniensis* have been referred by M. V. Lemoine to the genus *Champsosaurus* Cope. M. Dollo has recently published a critical comparison of Gervais' Lepidosteus with Champsosaurus to show that there is no point of resemblance between them, but that they present numerous and radical differences, and that Gervais' reference is correct. (Bull. Scien. de la France et de la Belgique, 1892.)

Cenozoic.—Señor Nogués, who has been exploring the Andesian volcanoes of Chillan, confirms the supposition of Pissis (*Geografia fiscia de la Republica de Chili,* 1875, Paris) concerning the existence of moraines of two distinct epochs, and therefore of glacial periods, one of them being anterior to the present volcanoes. This explains the orography of the region. (Geographical Journal, Feb. 1893.)——Mr. G. Cotteau, who is studying the fossil echinoderms of the Eocene of France, has recently described a number of new species belonging to the genera *Coptosoma* (Desor), *Liosoma* (Cotteau), *Micropeltis* (Pomel) *Circopeltis* (Pomel), and *Gagaria* (Duncan). The latter genus is represented in France by six new species belonging to the middle Eocene. (Revue Scien., Jan., 1893.)——Professor Cope recently exhibited to the Academy of Philadelphia a nearly entire mandible of the *Tetrabelodon shepardii* (*Mastodon shepardii* Leidy) from the Blanco (Pliocene) of Texas. He showed that it differs from the known species in the decurvation of the mandibular symphysis, which equals that of the corresponding part of the jaw of Dinotherium, but lacks the incurvature of that genus. He shows that the Mexican species formly referred to that species is distinct, and he proposed for it the name of *Mastodon oligobunis.*

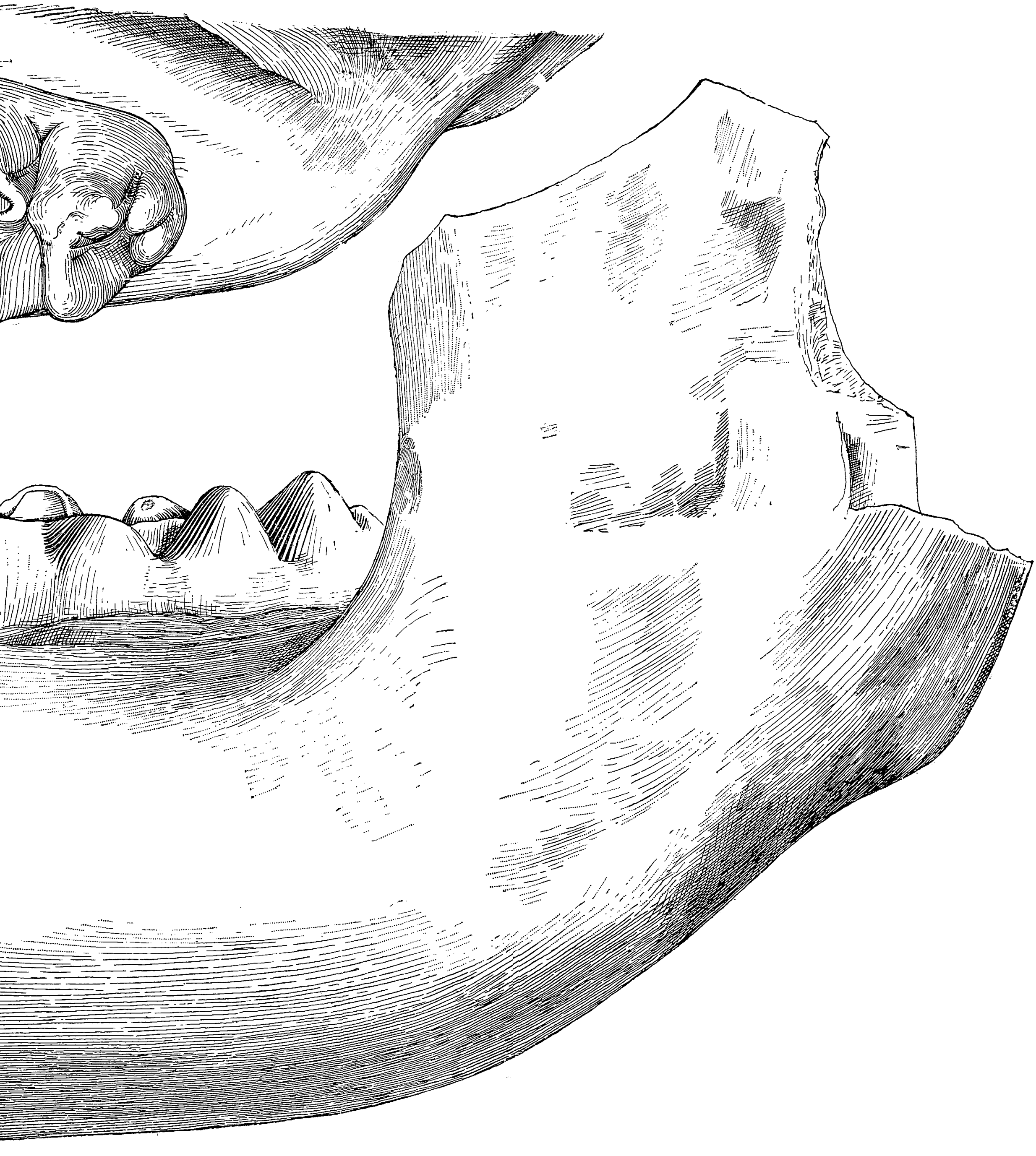


Tetrabelodon

PLATE XII.



Tetrabelodon shepardii Leidy. ½. (page 473.)



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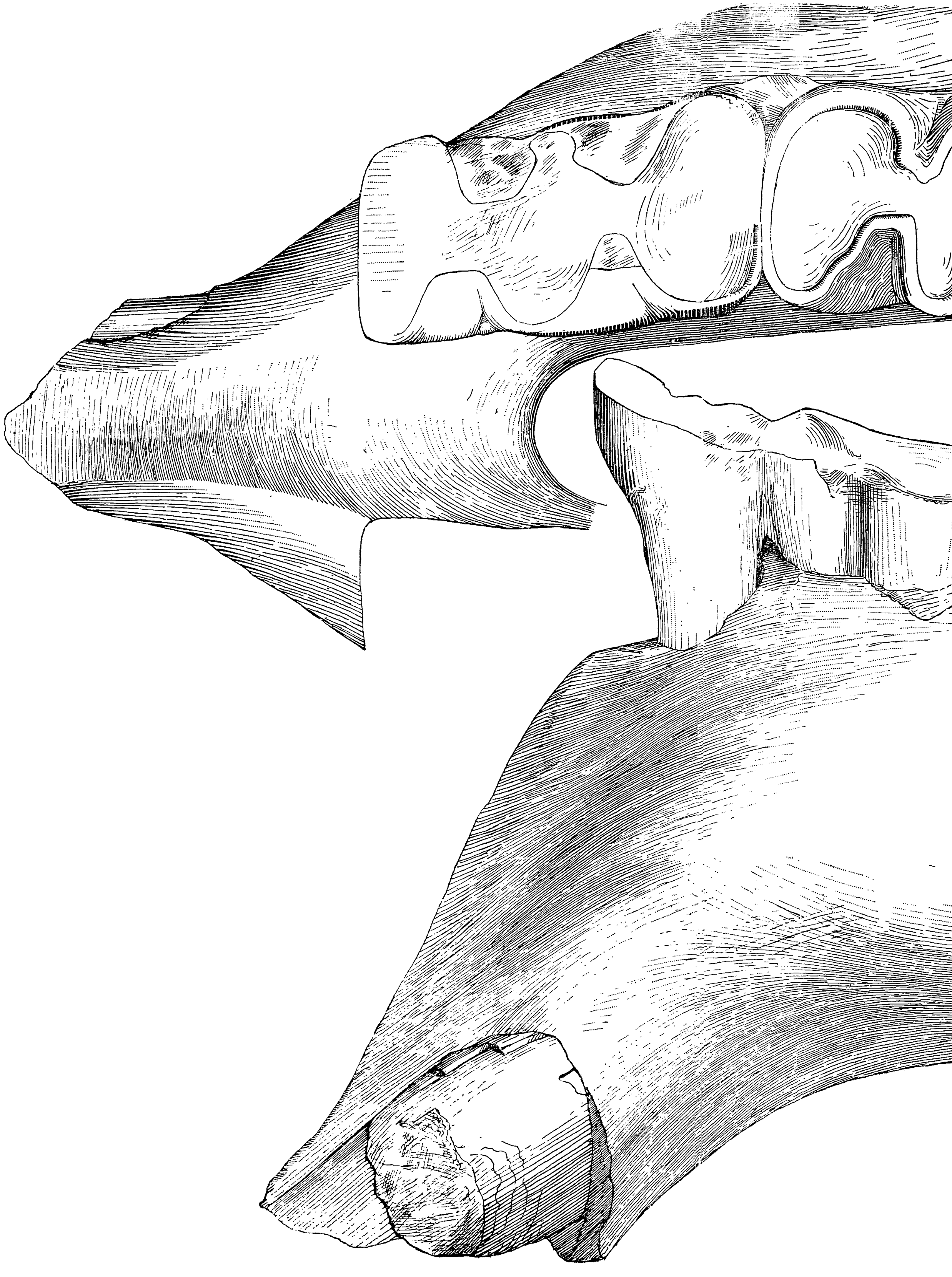
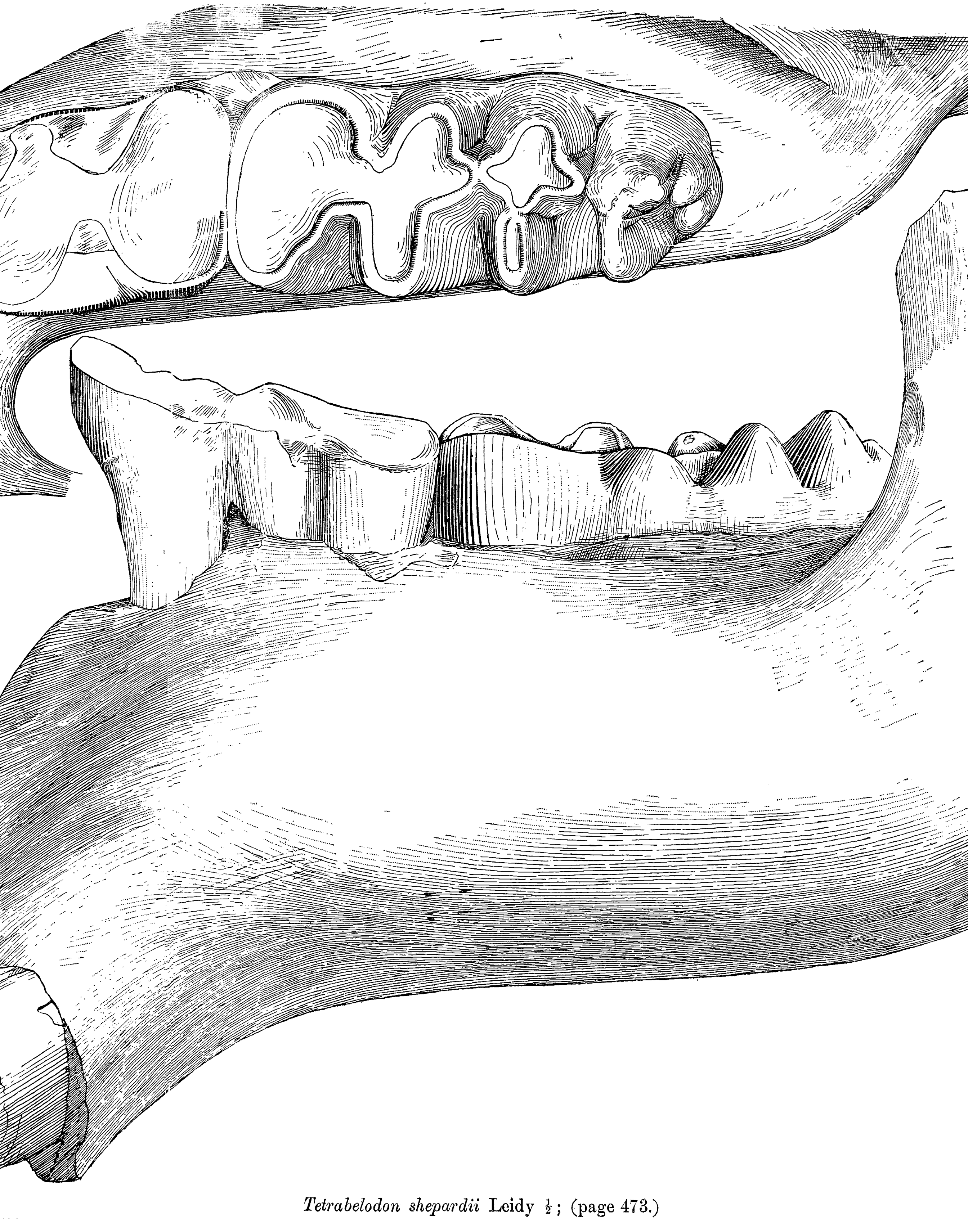
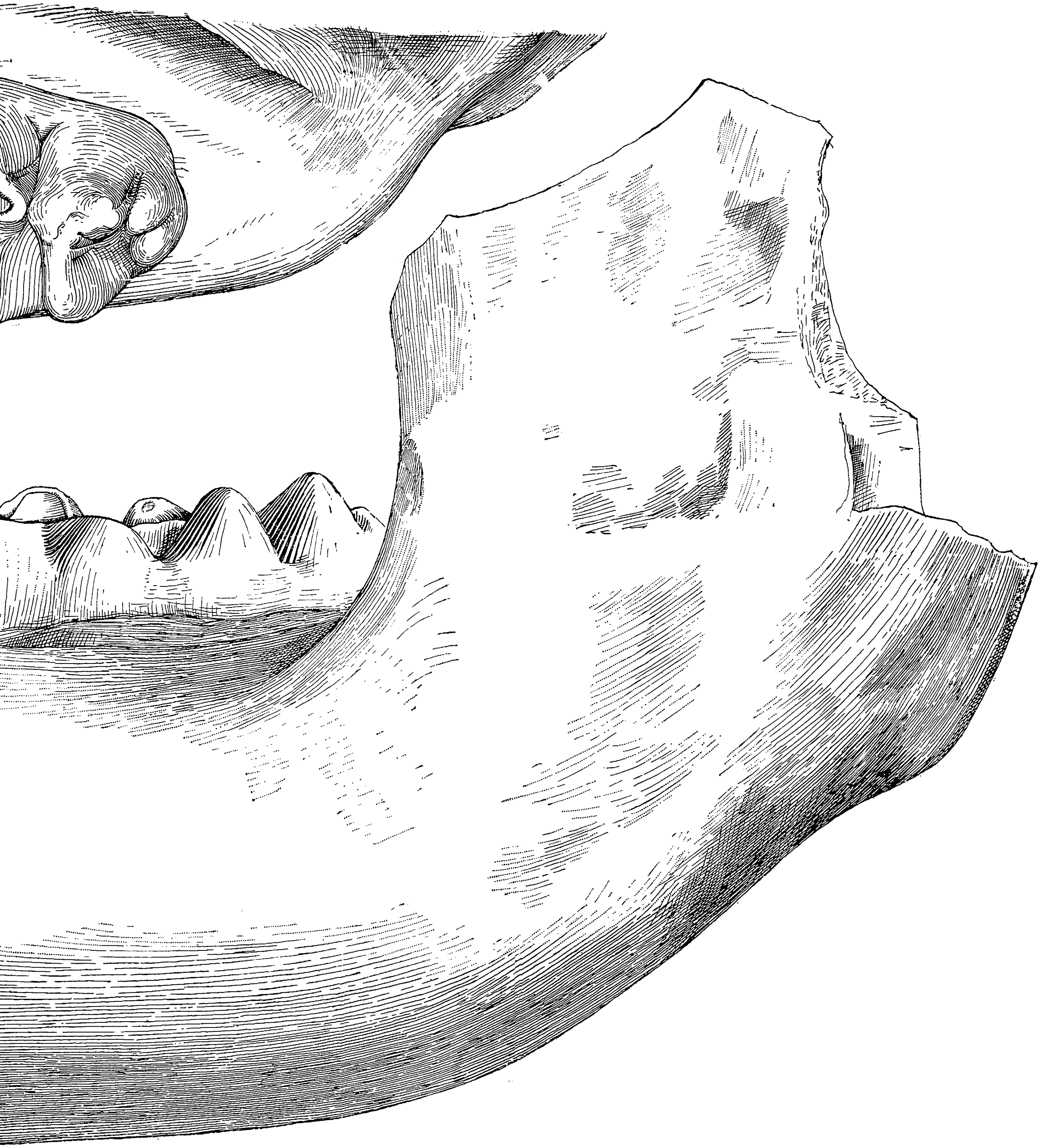


Tetrabelodon

PLATE XII.



Tetrabelodon shepardii Leidy ½; (page 473.)



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